

# COALITION FOR 4G IN AMERICA

April 28, 2010

Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W.  
Washington, DC 20554

Re: WT Docket No. 06-150; PS Docket No. 06-229; GN Docket No. 09-51

Dear Ms. Dortch:

The Coalition for 4G in America – MetroPCS Communications, Inc., Sprint Nextel Corporation, T-Mobile USA, Inc., Clearwire Corporation, Rural Telecommunications Group, Inc., Xanadoo Company, and Access Spectrum, LLC – has previously urged the Commission to combine the Upper 700 MHz A and D Blocks and to auction them as a single block. In support of this proposal, the 4G Coalition hereby submits the attached analysis, “Combining and Auctioning the Upper 700 MHz Band A and D Blocks in a Single Block: A More Efficient Spectrum Configuration to Benefit Consumers.” As explained in the paper, by combining and auctioning the A and D Blocks as a single block, the Commission will:

- ***Enhance spectrum value and promote economic growth*** by increasing the amount of standardized broadband spectrum available for use by a D Block licensee;
- ***Create synergies with the Lower 700 MHz Blocks*** by creating a 6 MHz paired block in the Upper 700 MHz band that corresponds with the paired block sizes in the Lower 700 MHz band;
- ***Promote spectral efficiencies*** by matching the available spectrum more closely with the specific bandwidth options contained within the LTE standard; and
- ***Maximize the efficient use of Upper 700 MHz A Block spectrum*** which is currently not configured to support standardized 4G broadband technologies and is not supported by current LTE standards.

Prompt FCC action is needed to achieve these benefits. The broadband standards-setting process is highly unlikely to develop LTE, WiMAX or other broadband standards for a 2x1 MHz block or a 2x6 MHz block in the Upper 700 MHz band *unless and until* the FCC moves expeditiously to combine the A and the D Blocks and auction them as a single block. Moreover, relying on secondary markets to combine the two blocks would impose significant transaction

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costs and coordination problems that would substantially delay and potentially prevent achieving the efficient gains and consumer benefits of combining the A and D Blocks.

Respectfully submitted,

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**COMBINING AND AUCTIONING THE UPPER 700 MHz BAND A  
AND D BLOCKS IN A SINGLE BLOCK: A MORE EFFICIENT  
SPECTRUM CONFIGURATION TO BENEFIT CONSUMERS**

April 28, 2010

## Executive Summary

- The extraordinarily valuable and useful spectrum in the Upper 700 MHz band is not currently configured to optimize the spectrum's natural advantages and to maximize use of this spectrum. To provide the most effective and intensive use of this valuable spectrum, the FCC must combine the Upper 700 MHz A and D Blocks and auction them as a single block. [See p. 1.]
- Secondary markets are unlikely to accomplish a timely and effective combination of the A and D Blocks that will support rapid build-out of this valuable spectrum. The quickest and most efficient mechanism for capturing the spectrum efficiencies, technical efficiencies and associated economic benefits is through FCC regulatory action that combines the A and D Blocks and auctions them as a single 2x6 MHz block. [See pp. 2-4.]
- The broadband standards process is highly unlikely to develop LTE, WiMAX or other broadband standards for a 2x1 or a 2x6 MHz block in the Upper 700 MHz band *unless and until* the FCC moves expeditiously to combine the A and the D Blocks and possibly not until the combined blocks are licensed through an FCC auction. The realities of developing equipment standards and producing cost-effective mass market devices render the employment of secondary markets an untenable proposition for the combination of the A and D Blocks. [See pp. 4-5.]
- The combination of the Upper 700 MHz A and D Blocks would result in a 2x6 MHz block, creating synergies with the lower 700 MHz paired blocks, each of which is also configured in a 2x6 MHz block. The Upper 700 MHz A Block's current stand-alone 1 MHz configuration does not support a standardized broadband configuration nor would it be supported by current LTE standards. Combining the A Block with the D Block would make the A Block spectrum usable for broadband (employing LTE or another technology) and would increase the broadband channelization options available to the D Block licensee. [See pp. 5-7.]
- The combination of the Upper 700 MHz A and D Blocks would substantially increase the amount of usable D Block spectrum – exceeding the percentage increase in gross spectrum from the addition of the A Block spectrum to the D Block. [See p. 5.]
- The spectral efficiencies gained by simply combining the A and D Blocks would increase the amount of Upper 700 MHz spectrum usable for broadband services, generating more spectrum value as well as associated economic growth and consumer benefits. [See p. 7.]

## I. Introduction

The Upper 700 MHz spectrum is particularly well-suited to wireless broadband services. Its propagation characteristics are such that its signal will experience only 14 percent as much attenuation (dispersion) as the signal for a system operating at 1.9 GHz, and thus can transmit at greater distances. Further, the lower frequency operation will provide better transmission through walls and diffraction around buildings. The extraordinary usefulness and value of the Upper 700 MHz spectrum increases the importance of managing the band effectively and ensuring that configurations are designed to optimize the natural advantages of its spectrum.

The current Upper 700 MHz band plan contains a 2x11 MHz C Block (assigned to Verizon Wireless), a 2x1 MHz A Block (assigned primarily to Xanadoo and Access Spectrum), a 2x5 MHz D Block (unassigned), a 2x5 MHz Public Safety broadband block, a 2x1 MHz Public Safety internal guard band, a 2x6 MHz Public Safety narrowband block, and a 2x1 B Block (unassigned). These are shown graphically below in Figure 1. The Coalition for 4G in America (made up of Sprint Nextel, T-Mobile, MetroPCS, Clearwire, Rural Telecommunications Group, Access Spectrum, and Xanadoo) has proposed combining the Upper 700 MHz A Block and D Block to create a 2x6 MHz block,<sup>1</sup> shown graphically below in Figure 2. There are three principal reasons for this combination, each of which is explained in the paper that follows:

- Optimization of the standards setting process;
- Economic efficiency; and
- Enhanced spectral and technical efficiency.

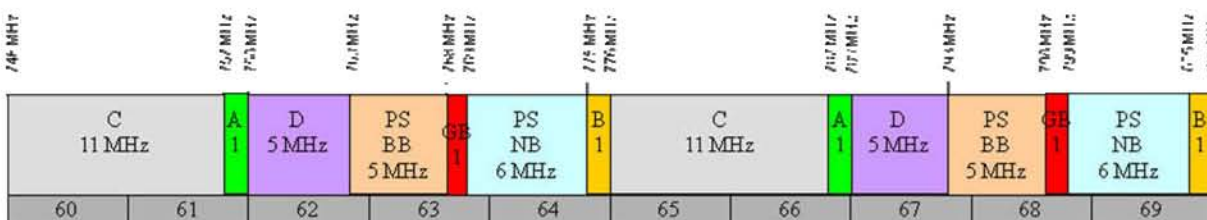


Figure 1: Current Upper 700 MHz Band Configuration

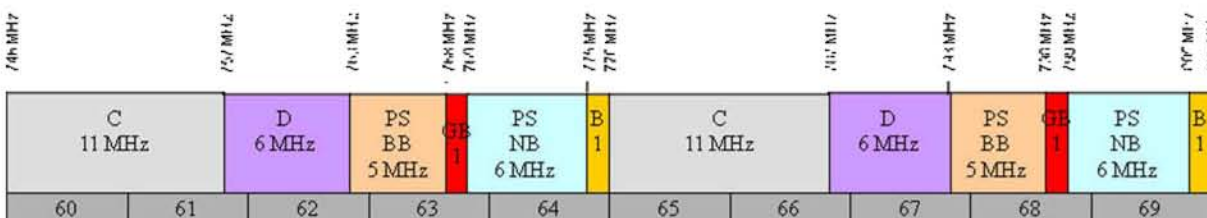


Figure 2: Proposed Upper 700 MHz Band Configuration

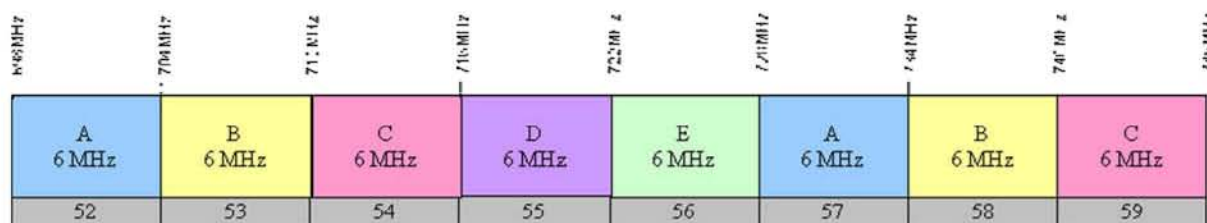


Figure 3: Current Lower 700 MHz Band Configuration

<sup>1</sup> Under this proposal, subject to the FCC adopting an appropriate framework and providing A Block incumbents with appropriate compensation, A Block incumbents would contemplate returning their spectrum to the FCC for purposes of auctioning the combined A and D Blocks in a single block.

## II. FCC Regulatory Action Is the Most Effective Way to Combine the A and D Blocks

As described below in section IV, the A and D Blocks are highly interdependent blocks of spectrum. There are significant spectral, technical, and economic efficiencies gained in combining these two complementary blocks. Indeed, the substantial efficiencies to be gained by aggregating the two blocks indicate that their combined value is worth more than the sum of their individual values as separate blocks. The added value of combining the two blocks will enhance consumer welfare by helping to ensure that the spectrum is put to its highest value use and by promoting innovation and new consumer services.

The quickest and most efficient mechanism for capturing these benefits is through FCC regulatory action that combines the two blocks and auctions them as a single 2 x 6 MHz license block. FCC action is far superior to relying on secondary market transactions to combine the two blocks following an auction of only the D Block. Relying on secondary markets would impose significant transaction costs and coordination problems that would substantially delay and potentially even prevent achieving the efficiency gains of combining the A and D Blocks. For example, private market transactions could be complicated by the potential for the D Block to be auctioned in different geographic license areas than the current licensing of A Block spectrum in 52 MEAs. Moreover, “strategic holdouts” may prevent efficient transactions in the secondary market.

The FCC would avoid these transaction costs and coordination problems by auctioning the A and D Blocks in a single block. As Evan Kwerel and John Williams stated in their OPP Working Paper 38,

The FCC is in the best position to solve the *coordination problem* of putting highly interdependent spectrum up for auction at the same time. ... The FCC is also in the best position to solve *incentive problems* associated with ensuring participation and mitigating holdout problems. ... Finally, the FCC has certain real cost advantages in running a band-restructuring auction.<sup>2</sup>

The Kwerel and Williams paper proposes a mechanism under which incumbent spectrum and unassigned spectrum would be auctioned by the FCC at the same time so that the combined spectrum rights can be transitioned to their highest value use. Although the Kwerel and Williams paper concerned a more comprehensive proposal for transitioning to a market-based spectrum allocation regime, the elements of their proposal apply with equal strength to the A and D Blocks. As explained, the key elements of the Kwerel and Williams proposal provide a strong justification for the FCC to combine and auction the A and D Blocks as a single block rather than rely on the secondary markets to combine these two blocks.

### 1. Speed

*Speed is an essential attribute of a good transition mechanism because delaying the widespread market allocation of spectrum could cause tens of billions of dollars in lost benefits to consumers.*<sup>3</sup>

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<sup>2</sup> Evan Kwerel and John Williams, “A Proposal for a Rapid Transition to Market Allocation of Spectrum, OPP Working Paper 38, at 23 (Nov. 2002).

<sup>3</sup> *Id.* at 9.

By combining the A and D Blocks and auctioning them as one block, the FCC will expedite the most efficient allocation of the A and D Block spectrum, enable the A Block to be included in the ongoing standards process, and accelerate the deployment of new services in the combined band.

2. Low transaction costs

*A good market mechanism for spectrum should have low transaction costs. This means low costs to participate and to run. Participation costs include not only direct out-of-pocket expenses but also the time of staff and management to buy or sell spectrum rights. Participation and market operation costs should be small relative to the value created by the transactions.*<sup>4</sup>

An FCC auction of the combined A and D Blocks will substantially lower the transaction costs of combining these two blocks and putting this spectrum to its highest value use. It would avoid the need for D Block auction winners to engage in extensive, costly, and time-consuming bilateral and multi-lateral negotiations with A Block incumbents over an uncertain time frame following the D Block auction.

3. Transparency

*A good market mechanism should be transparent. A transparent process is clearly understood by participants and perceived as honest.*<sup>5</sup>

A combined A and D Block auction would be based on clear rules and procedures, thereby promoting greater interest in the auction and the assignment of the combined block to the entity that values it the most. A process that relies on secondary markets to combine the two blocks would involve a series of private transactions taking place at different times with different parties, resulting in a less transparent process that discourages efficiency-enhancing trades.

4. Liquidity

*High liquidity is another desirable property of a market. In a highly liquid market a buyer or seller is always able to make a trade at a price close to a well-established market price. ... Absent a liquid market for spectrum, incumbents do not have good information about the value of their spectrum, and potential buyers do not have good information of the cost of acquiring spectrum. A liquid market provides this information, and thus facilitates transfers of spectrum to its highest value uses.*<sup>6</sup>

An FCC auction of the combined A and D Block will facilitate a liquid market for this spectrum, providing a more efficient market mechanism for pricing the spectrum rights and facilitating efficient transfers of these rights.

5. Participation

*All parties who can gain from trade should have the incentive to participate in the market mechanism. Two market failures that may prevent efficient trades are strategic holdouts and agents not pursuing the best interest of their principals.*

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<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> *Id.* at 10.

*Strategic holdouts are a well-known phenomenon in large-scale real estate redevelopment projects when multiple incumbents must be cleared. Each incumbent who can individually block a project hopes to get a bigger share of the gain from development by being the last to settle. In some cases value-enhancing redevelopment is significantly delayed. In other cases, the project is changed to work around an incumbent who refuses to sell, and sometimes no redevelopment occurs even though it would be highly valuable. Conflicting incentives within firms, sometimes referred to as the principal-agent problem, is the second market failure that may prevent efficient participation.<sup>7</sup>*

By combining and auctioning the A and D Blocks, the FCC will eliminate potential strategic holdouts and other potential market failures which could inhibit private market transactions.

#### 6. Simultaneity

*Another property of an efficient market mechanism for spectrum is simultaneity: All highly complementary and substitutable spectrum should be available to the market at the same time. ...Simultaneity provides buyers with information about the prices of relevant complements and substitutes, and allows them to act on that information – to combine complementary spectrum into the most efficient packages and to choose among substitutable spectrum. If complementary items are offered for sale sequentially, buyers seeking a package of items will not know how much to bid for those items first put up for sale without knowing the likely prices of the complementary items that will be up for sale later.<sup>8</sup>*

Simultaneity is critical to ensuring that the A and D Blocks are put to their highest value use. An FCC auction of the combined A and D blocks is the most expeditious and date-certain mechanism to provide potential buyers the information they need to price and efficiently acquire these two highly complementary spectrum blocks.

In sum, by combining and auctioning the A and D Blocks in a single block, the FCC can avoid the significant transaction costs and coordination problems that would inhibit secondary market efforts to combine the two blocks. An FCC auction of the combined blocks would provide a faster, more transparent, and far more efficient mechanism for putting these complementary spectrum blocks to their highest value use.

### **III. FCC Action Is Necessary To Facilitate the Development of Broadband Equipment Standards for a Combined A+D Block**

While section II of this paper explains the economic basis for concluding that active FCC spectrum management is superior to passive reliance on secondary markets for combining the A and D Blocks, there is also a compelling standards setting basis for reaching the same conclusion in an expeditious fashion. Critically, the realities of developing equipment standards render the employment of secondary markets an untenable proposition for the combination of the A and D Blocks.

Using broadband technology to achieve the technical efficiencies described in Section IV depends upon the availability of technical equipment standards. Current 3GPP standards for

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<sup>7</sup> *Id.* at 10-11.

<sup>8</sup> *Id.* at 11-12.

Band 14 (which currently consists of the Upper 700 MHz D Block and the Public Safety Broadband Block) include specifications for the D Block and the Public Safety Broadband Block, but they do not include specifications for a combined A and D Block. There also are no 3GPP specifications for a stand-alone A Block because LTE requires a minimum 1.4 MHz pair. Unless a combined A and D Block is included in 3GPP standards for Band 14, equipment will not be manufactured by the primary vendors that would permit D Block licensees to practically utilize the A Block spectrum to achieve the variety of LTE configurations outlined below.

Equipment providers will expend resources on developing standards only for spectrum configurations that have a high probability of being developed for commercial use. This includes investigating various component technologies to meet the specific interference and deployment characteristics for the band configuration. With respect to the D Block, standards such as the 3GPP Rev 9 standard have been developed for a 2x10 MHz block because the FCC designated the spectrum in 2007 for a public-private partnership between the D Block licensee and the Public Safety Broadband Licensee. The process to develop the 2x10 MHz block standard took many months. The outcome of that process is a standard that provides an understanding of the spectrum's potential (*i.e.*, the amount of usable spectrum in the configuration, the cost of technical interference mitigation technologies, etc.) when, in the case of the 3GPP process, the LTE technology standard is deployed. The standards process is driven by the market potential and the needs of the service providers and typically treats uncertainty about a spectrum block's potential for inclusion in a band configuration by ignoring it. Accordingly, the 3GPP standards body most likely would not develop a standard based upon a 2x6 MHz deployment until the FCC combines the A and D Block and possibly not until the combined blocks are licensed through an FCC auction.

The 3GPP standards-setting process will simply not address a stand-alone A Block because of its narrow channel size. Moreover, if the A Block is not addressed by the standards setting process in conjunction with the D Block – and it will most likely not be addressed unless the FCC acts to combine the A and D Blocks – standards are not likely to be developed for a 2x6 MHz block in the Upper 700 MHz band. Therefore, from a standards perspective, the most expeditious and economically efficient mechanism would be for the FCC to combine the A and D Blocks immediately, thereby providing certainty of a 2x6 MHz block in the Upper 700 MHz band and allowing the standards setting process to move forward.

#### **IV. Combining the A and D Blocks Would Enhance Synergies Between the D Block and the Lower 700 MHz Blocks and Increase Spectral Efficiencies**

Combining the Upper 700 MHz A and D Blocks would result in significant public interest benefits. The combination would result in a 2x6 MHz paired block, creating synergies with the lower 700 MHz paired blocks, each of which is also configured in a 2x6 MHz block. The combination of the A and D Blocks also would result in significantly more usable spectrum for the D Block licensee. This will maximize the efficient use of this spectrum, which in turn will increase the value of D Block spectrum and benefit consumers.

##### **A. Synergies with the Lower 700 MHz Blocks and Maximizing Use of A Block Spectrum**

The Lower 700 MHz band is configured in 6 MHz blocks (some of which are paired). The Upper 700 MHz band is configured with 11 MHz, 1 MHz, and 5 MHz paired blocks. The 3GPP standards which include E-UTRA (also known as LTE) have developed possible deployments using each of these configurations, with the exception of the 1 MHz paired Upper 700 MHz A Block.

The combination of the A and D Blocks would provide a 6 MHz paired block in the Upper 700 MHz band that corresponds with the 6 MHz A, B and C Blocks in the Lower 700 MHz band. Mirroring the Lower 700 MHz block sizes will enable the use of the same standards and equipment designs across the Upper 700 MHz D Block and the Lower 700 MHz paired blocks. The standards have already been developed to allow deployment of 1.4, 3, 5, and 10 MHz size blocks. The use of technologies across similar block sizes could simplify, and lower the costs of, chip sets for handset devices that could be used across the entire 700 MHz band.<sup>9</sup> Moreover, the D Block licensee would be able to take advantage of this “head start” that has been made on developing LTE equipment for the 6 MHz blocks in the Lower 700 MHz band.

Configuring the Upper 700 MHz A and D Blocks to match the 2x6 MHz configurations in the Lower 700 MHz band will thus provide beneficial synergies in equipment design and deployments. In addition to these synergies, combining the A and D Blocks will ensure that the Upper 700 MHz A Block does not go underutilized. In particular, the combination of the A and D Blocks would remove pockets of the 700 MHz band where standard 4G technologies cannot be utilized, thereby increasing the options for deploying broadband services across the entire 700 MHz band. As explained below, an LTE broadband channel cannot be deployed, using 3GPP standard channel widths, in the current 1 MHz configuration of the A Block.<sup>10</sup> Combining the A and D Block would allow the A Block’s valuable 700 MHz spectrum to be channelized for broadband services consistent with 3GPP standards for LTE. This would maximize the use of highly valuable 700 MHz frequencies for 4G services, helping to meet the growing consumer demand for wireless broadband services.

## **B. Spectral Efficiencies**

In addition to the foregoing benefits, the combination of the A and D Blocks would enhance spectral efficiencies by matching the available spectrum more closely with the specific bandwidth options contained within the LTE standard.

The LTE standards allow for deployment of LTE in configurations of 1.4 MHz, 3 MHz, 5 MHz and larger bandwidths. The addition of the A Block spectrum, which standing alone is simply too narrow a channel pair to accommodate LTE configurations, would create a 6 MHz D Block, thereby providing alternatives for additional LTE channel configurations (*i.e.*, the D block could be used for either one 5 MHz LTE channel or two 3 MHz LTE channels). It would also facilitate the use of additional interference mitigation techniques in LTE network design. Thus, the combination of the A and D Blocks would produce a substantial improvement over current channelization options for the existing 5 MHz D Block configuration, based on available 3GPP standards.<sup>11</sup>

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<sup>9</sup> The benefits may also extend to dual-band devices for use in other spectrum bands that are configured with similar block sizes. For example, a broadband technology deployed in the 2.5 GHz band that is usable on 5.5 MHz channels may be deployable in a 6 MHz block, but not a 5 MHz block, in the 700 MHz band.

<sup>10</sup> Had the prior Commission, in 2007, configured the A Block into 1.5 MHz pairs as Xanadoo and Access Spectrum recommended at the time, along with several leading commercial technology companies and service providers including Intel, Google, Yahoo, DirecTV, EchoStar, and Skype, the stand-alone A Block could have supported a 1.4 MHz LTE broadband channel.

<sup>11</sup> Some licensees may not choose to configure their networks using a mixture of narrow and larger bandwidth channels, but rather would prefer to use the single largest standardized channel bandwidth that the combined spectrum can support. However, the value of the 700 MHz spectrum is so great that other licensees may choose to utilize whichever combination of standardized channel bandwidths would enable

Combining the A and D Blocks will increase the amount of standardized broadband spectrum available for use by a D Block licensee. These spectral efficiencies can be translated into economic efficiencies. Spectrum that is otherwise usable but cannot be used because there is no standard supporting it imposes a quantifiable economic cost that can be minimized with efficient spectrum management. Moreover, by freeing up additional usable spectrum, combining the A and D Blocks not only increases the value of the combined A and D Blocks, it also promotes more economic growth and consumer benefits as the combined spectrum blocks are put to more productive economic use.

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the maximum use of the spectrum available to them. Combining the A and D Blocks would increase the available options for licensees to design their networks in the manner that is most valuable to them.